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Southern Pine BEETLE NEWS

U.S.D.A. SOUTHERN PINE BEETLE RESEARCH & APPLICATIONS PROGRAM

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Beetle-Killed Trees Reveal Lower Lumber Grade Yield

A study in Virginia has found that both yield and grade of lumber are lower for beetle-killed trees than for green controls. Major causes of degrade are rot and borer damage.

Sawtimber trees in several loblolly and shortleaf pine plots were allowed to stand 12 months after foliage fade. Sixty-two dead and control trees were then felled from the infestation perimeter and taken to sawmills. Average diameters at breast height of infested and control trees were similar.

All logs were sawn, scaled, and graded. The grade yield from upper logs (compared with butt-logs) of beetle-killed trees was lower than normal. Apparently, the upper part of the tree deteriorates faster than the lower. Blue stain was heavier in the upper section but was not a source of degrade.

The amount of two-inch dimensional board-foot volume in grades 1 and 2 shows the degrade. In controls, amounts were 93 percent in the upper logs and 95 percent in butt-logs. In beetle-killed trees, respective figures were 54 and 73 percent, again suggesting high deterioration in the upper portion.

Highest grade lumber is normally taken from the clear outer sapwood layer, but with beetle-killed trees it was taken from the inner. Since the outer portion decays first in these trees, the amount of high-grade lumber is reduced.

SINCLAIR, S. A., G. IFJU, and H. J. HEIKKENEN. 1977. Bug boards: lumber yield and grade recovery from timber harvested from southern pine beetle infested forests. South. Lumberman 234 (2900): 9-10.

Behavioral Chemicals Reduce Landing on Host Trees

A slow release formulation of the pheromones *endo*- and *exo*-brevicomin has reduced landing of beetles on host trees in east Texas. Flight activity within the infestation, however, was not affected.

The study site was a 500-tree infestation in a mixed loblolly pine-hardwood forest. Tests ran for 24 days. Landing trap catches showed that the treatment did inhibit or interrupt landing on an area basis, even though only 12 of the 34 traps were surrounded by dispensers.

The behavioral chemical treatment was *endo*- and *exo*-brevicomin dispensed from hollow fiber controlled release strips. No bias from climatic factors was suggested.

PAYNE, T. L., J. E. COSTER, and P. C. JOHNSON. 1977. Effects of slow-release formulation of synthetic *endo*- and *exo*-brevicomin on southern pine beetle flight and landing behavior. J. Chem. Ecol. 3 (2): 133-141.

Pulp Yield Determined for Beetle-Killed Trees

Loss of wood value in SPB-killed trees left on the stump for up to three years is mainly due to decay. Following death of the tree, decay increases with time. But in nine sample plots studied, no drop in kraft pulp was found when beetle-killed trees were compared with green controls. These results indicate that pulp yield is not affected much by allowing dead trees to remain on the stump for an extended period of time.

Although kraft pulp yield did not decrease, tearing resistance of prepared handsheets decreased for trees left as little as 0-6 months. Paper tensile strength increased slightly after 6 months, then began decreasing until it reached a small but significant loss after 24 months.

This study is one of the first efforts to determine properties of wood and fiber from beetle-infested trees allowed to remain in the forest. Knowledge of pulp and paper properties can assist landowners and managers in scheduling the harvest of affected stands.

FERGUSON,PAUL C. 1977. Utilization potential for pulp and paper of southern pine harvested from beetle-infested forests. M.S. Thesis, Va. Polytech. Inst. & State Univ., Blacksburg. 58 p.

OFFICIAL NEWSLETTER OF THE U.S.D.A. EXPANDED SOUTHERN PINE BEETLE RESEARCH & APPLICATIONS PROGRAM (ESPBRAP)
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Sampling Schemes Compared

In an investigation of sampling schemes for estimating within-tree populations of attacking beetles, it was found that the best small sample estimates are obtained near the middle of the infested bole. High precision estimates can be obtained only by sampling the infested bole at frequent intervals.

The topological mapping technique served as a control for five small sample methods. It was found that sample height and number of disks sampled have considerable impact upon precision. Sampling at two heights near the middle of the bole increases precision and four disks per height are preferred.

Results of this investigation will help investigators determine where to sample and how many samples should be taken to satisfy their specific data requirements.

PULLEY, P. E. et al.

1977. Sampling procedures for within-tree attacking adult populations of the southern pine beetle. Can. Ent. 109: 39-48.

Evaluation Method Designed for SPB Recreation Impact

A beetle outbreak can affect outdoor recreation by creating unsightly appearance, lack of shade, and physical danger from dead or decayed trees—factors that combine to undercut the recreational value of a site.

A methodology has been designed to estimate the recreational benefits of a beetle control program. It gives monetary estimates of recreation losses associated with tree mortality.

Recreation value losses were estimated for 19 recreation sites on two east Texas reservoirs. A demand function—the "scenic value" of which included the amount of pine forest—was estimated for each site. The effect of a beetle attack was then simulated by reducing the value of the pine variable and re-estimating the recreational value.

For the areas studied, public visitation was directly related to area of the sites covered by pine crowns.

With this method, various levels of control and beetle attack can be simulated. The method can also be used for other disease and insect control programs.

YOUNG, RODNEY L.

1977. Estimation of the economic impact of southern pine beetle on reservoir recreation. M.S. Thesis, Va. Polytech. Inst. & State Univ., Blacksburg. 119 p.

Mite Identification Simplified

Using a new key to mite species commonly associated with the southern pine beetle, even those untrained in acarology can identify species easily.

Fifteen of the 96 known species associated with bark beetles in the South are transported by *Dendroctonus frontalis*. Although these mites do not directly harm the beetle, they cling to the beetle to disperse themselves and may therefore influence beetle flight.

Identification of families and superfamilies requires only a good hand lens or a dissecting microscope. For species identification, however, specimens must be mounted. A guide to mounting is therefore included.

Color and behavioral characteristics are described and each specimen is clearly illustrated.

KINN, D. N.

1976. Key to mites commonly associated with the southern pine beetle. USDA For. Serv. Res. Note SO-214. 11 p. South. For. Exp. Stn., New Orleans, La.

Hedden Joins Technical Review Panel

Dr. Roy L. Hedden, forest entomologist for Weyerhaeuser Company in Hot Springs, Arkansas, has joined the Program's *ad hoc* Technical Review Panel. He replaces Darwin Fender, Manager of Forest Productivity and Research, International Paper Company, Mobile, Alabama.

A native of Auburn, Washington, Hedden attended the University of Washington and received his Ph.D. in 1975. In 1973 he became research associate at the Boyce Thompson Institute for Plant Research in California and Idaho. He then served as entomologist with the Texas Forest Service, Lufkin, before joining Weyerhaeuser in 1976.

Hedden's research areas include forest insect ecology, silvicultural management of insect populations, insect pheromones, integrated pest management, and biometrics. As a member of the panel he will represent the applied interests.

WORKSHOP GROUPS DISCUSS INTEGRATION OF DATA

Researchers investigaing mortality/competition factors and birth population dynamics met in Nacogdoches, Texas, May 4-5. They discussed accomplishments and ways to integrate findings into life tables and models under development.

Studies with clerid beetles in Mississippi are expected to develop an SPB destroyer model, while research in Arkansas on insect natural enemies continues in conjunction with population studies. Partial life tables indicating causes of SPB mortality by life stage have been conducted. This research should reveal functional relationships between beneficials and prey and should estimate the number of beneficials as related to tree species, spot size, and time over a fairly large area.

Mite researchers in Louisiana are looking at the effects of mite load on SPB dispersal. These studies have obtained data on the density of mites over the beetle-infested portion of the tree bole. However, investigators do not soon expect definitive information on the influence of mites on SPB populations.

In woodpecker research in east Texas, a submodel showing the influence of selected stand and beetle population parameters on the predator complex has been constructed. This work seems to have potential for early incorporation into life tables and into the spot growth model being developed at Texas A&M. (This spot growth model was demonstrated at the workshop and will be improved as more data on insect, host/stand, and climatic interactions become available.)

Simulator Estimates Benefits of Pest Management Program

A rudimentary simulator has been developed to establish future SPB timber mortality over large areas. This simulator, FRONSIM, indicates the general level of efficient expenditures of pest management programs.

FRONSIM requires only basic data such as monthly mean number of spots, frequency distributions of diameter and number of trees per spot, and certain marketing data. Results of repeated simulations in any one year are averaged, and the averages for all future years are combined to estimate future damage. Damages with a proposed program are then calculated, and the difference between the two simulations reflects the benefit of the program.

Examining SPB trends in east Texas, researchers tested the simulator by using data such as weather information and knowledge of SPB damage, and when data were unavailable, by using the analyst's judgment. It was concluded that FRONSIM is basically sound if data are representative of the area being simulated. The simulator therefore provides a means for developing financial guidelines, given current levels of knowledge and data collection.

LEUSCHNER, WILLIAM A., T. G. MATNEY, and H. E. BURKHART.

1977. Simulating southern pine beetle activity for pest management decisions. Can. J. For. Res. 7(1): 138-144.

Buffam Transfers to Portland

Paul Buffam, who has been Applications Coordinator for the Southern Pine Beetle Program since April of 1975, has transferred to the Pacific Northwest Regional Office in Portland, Oregon.

Buffam will now be Staff Director for Forest Insect and Disease Management in the Northwest. He replaces David Graham.

A replacement for Buffam as Applications Director is to be named soon.

A Guide for Estimating Within-Spot Beetle Population

A guide has been developed for estimating within-spot beetle populations. Designed for field use, the guide lets the investigator form sampling plans according to precision desired and resources available.

Two step-by-step procedures are presented. Each consists of a series of distinct operations that take place after a spot is located: field operations to collect information and samples, laboratory operations to estimate insect densities within bark samples, and calculations to produce the desired precision estimates. Confidence intervals can then be placed on the estimates.

Each operation is discussed in enough detail to permit investigators to accomplish their specific sampling objectives. (See related within-tree guide, Newsletter 7.)

FOLTZ, JOHN L. et al.

1977. Procedural guide for estimating within-spot populations of *Dendroctonus frontalis*. Texas Agric. Exp. Stn. MP-1316, 27 p.

Guide Developed for Biology of SPB

A guide has been developed for identifying larval stages of SPB on radiographs.

Comparisons of grub size and number of larval stages were made on beetles from Texas, Virginia,

Georgia, and Mississippi. Summer and winter data on the Mississippi beetles were compared.

Beetles in each area and season went through four larva phases. But the average head size was bigger in winter than in summer.

In addition, three ways of estimating life periods of the beetle were examined. Although the estimates varied at times, there was general agreement that beetle egg stage lasts anywhere from 8 to 27 days, larva stage from 10 to 62 days, and pupa stage from 7 to 25 days, depending on temperature and nutrition.

MIZELL, R. F., III.
1977. Developmental biology of the southern pine beetle, *dendroctonus frontalis* Zimmerman. M.S. Thesis. Miss. St. Univ., Miss. State, 70 p.

OTHER PUBLICATIONS OF INTEREST

Hemingway, R. W., G. W. McGraw and S. J. Barras.
1977. Polyphenols in *ceratocystis minor* infected *pinus taeda;* fungal metabolites, phloem and xylem phenols. J. Agric. Food Chem. 25(4): 717-722.

Leuschner, W. A., R. C. Thatcher, T. L. Payne, and P. E. Buffam.
1977. SPBRAP—an integrated research and applications program. J. For. 75(3): 478-480.

McGraw, G. W. and R. W. Hemingway.
1977. 6,8-Dihydroxy-3-hydroxymethylisocoumarin, and other phenolic metabolites of *ceratocystis minor.* Phytochemistry. 16:1315-1316.

Matney, T. G.
1977. An investigation, comparison, and development of individual tree competition models. Ph.D. Dissertation. Va. Polytech. Inst. & State Univ., Blacksburg, 75 p.

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